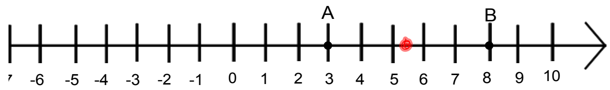
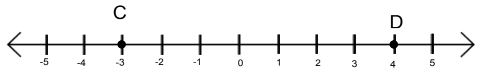
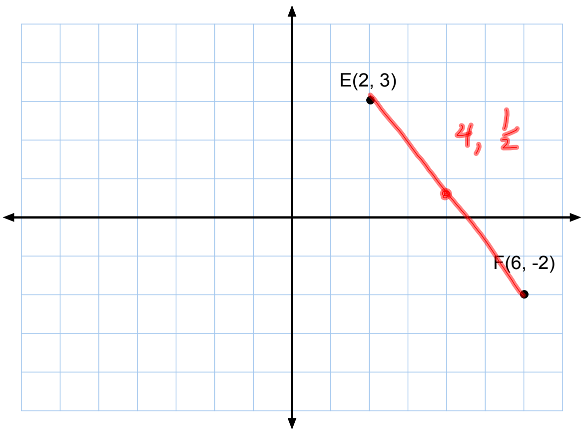
8-1 Midpoint and Distance Formulas



$\frac{3+8}{2} =$ M= 5.5



$\frac{-3+4}{2} = \frac{1}{2}$



Midpoint Formula

$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

Find the midpoint of:
A(4, 3)
B(-2, 5) M(1, 4)

M is the midpoint of $\overline{AB}$. Find the other endpoint if:

A(8, 3)
M(12, 5)
B (?)

$\frac{8+x}{2} = 12$ $\frac{3+y}{2} = 5$

8+x = 24 3+y = 10

x = 16 y = 7

x, y
(16, 7)

A(-1, 0)
M(-3, 5)
B (?)
x, y
(-5, 10)

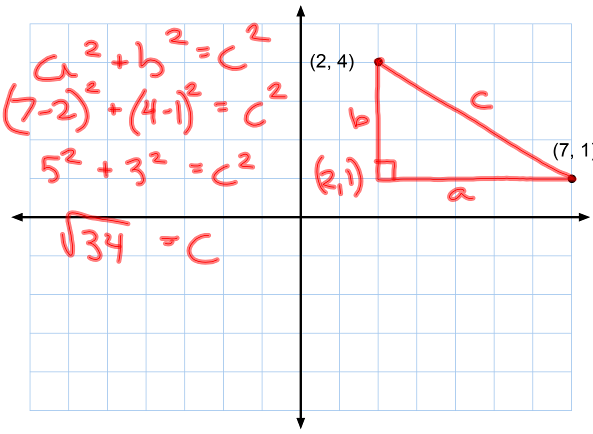
$\frac{-1+x}{2} = -3$ $\frac{0+y}{2} = 5$

x = -5 y = 10

Find the distance between the two points.

$|10 - -3| = 13$

$|5 - -3| = 8$

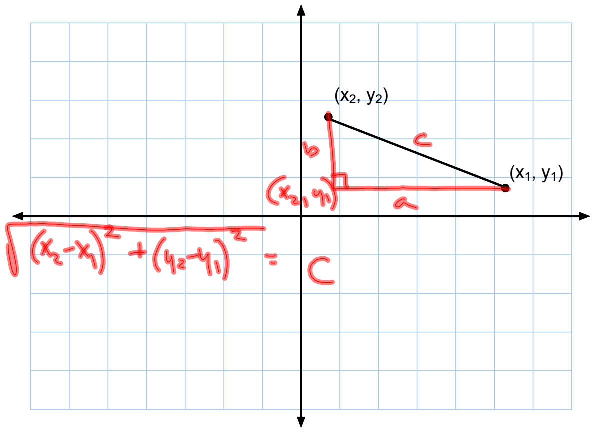


$a^2 + b^2 = c^2$

$(7-2)^2 + (4-1)^2 = c^2$

$5^2 + 3^2 = c^2$

$\sqrt{34} = c$



$\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2} = c$

The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Find the distance between:
(-1, 4) (2, -3)

$d = \sqrt{(2 - -1)^2 + (-3-4)^2}$

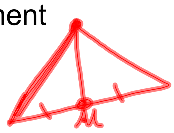
$9 + 49$

$d = \sqrt{58}$

Find the distance between:
(2, -5) (3, 1)

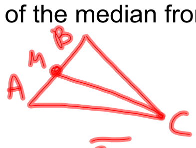
$d = \sqrt{37}$

Median of a triangle--is a segment that connects a vertex and the midpoint of the opposite side.



Example 1:
Find the length of the median from C to $\overline{AB}$.

A(-3, 0)
B(3, 2)
C(2, -4)



$\overline{AB}$

$M\left(\frac{-3+3}{2}, \frac{0+2}{2}\right)$

$M(0,1)$

$\overline{CM}$

$d = \sqrt{(2-0)^2 + (-4-1)^2}$

$d = \sqrt{29}$

Example 2:
Find the length of the median from A to $\overline{CB}$.

A(-3, 0)
B(3, 2)
C(2, -4)

HW
p414-415
11-17, 25-33 odd, 36, 37